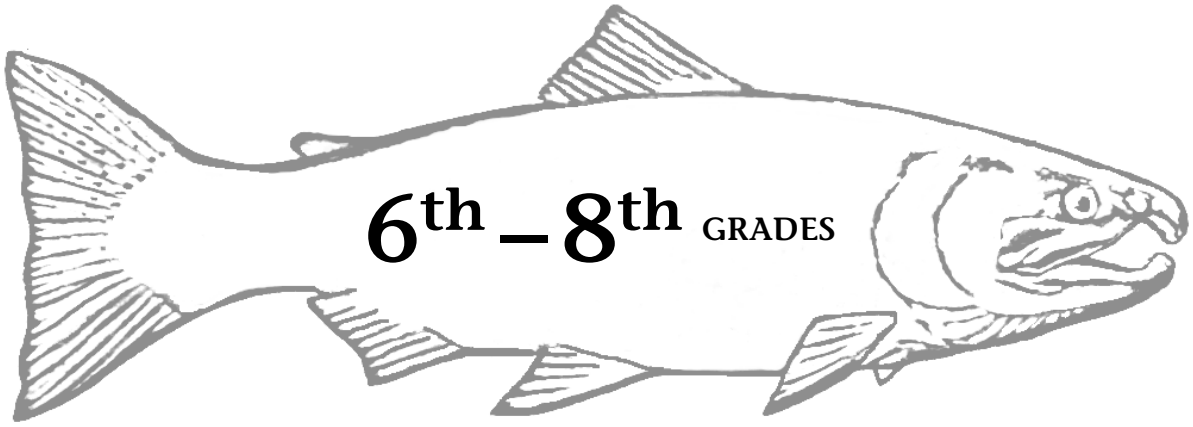
Creating
COASTAL STEWARDSHIP
through Science

Monitoring Creek Health

at Point Reyes National Seashore

2000 First Edition



Lynne Dominy
Christie Denzel Anastasia
Project Managers

This project was made possible by funding from:

NATIONAL PARK SERVICE
Department of the Interior

EXXON

National Park FOUNDATION

POINT REYES NATIONAL SEASHORE ASSOCIATION

Publishing Information

This curriculum guide was funded with grants through the National Park Foundation.

The listing of a resource in this curriculum does not presume its endorsement by the National Park Service.

This guide may be obtained by participating in a teacher workshop at Point Reyes National Seashore or through a teacher in-service training at your school.

Teachers are encouraged to offer their feedback by filling out the enclosed evaluation form or contacting Point Reyes National Seashore directly.


Printed on recycled paper using soy-based inks.

ISBN: 0-911235-07-8

Preface

The intent of these guides is to provide middle school students with the opportunity to observe natural processes at Point Reyes National Seashore so they might take a greater interest in environmental stewardship and science. Teachers from fifteen area schools developed and field-tested seven "Creating Coastal Stewardship through Science" guides for classroom and field trip use. Each guide is carefully designed to facilitate a hands-on learning experience using science and the environment. Natural resources such as Pacific gray whales, northern elephant seals, tule elk, California quail, Douglas iris, and the San Andreas Fault are highlighted because they are easy to identify and to observe. All activities are linked to the California State Science Standards (2000) and the National Science Standards.

You may use this guide alone or in conjunction with other guides. We highly recommend that whenever you use a guide, you use the pre-visit activities to fully prepare the students for the field trip. These activities address student safety, wildlife observation techniques, equipment use, field journal development, and concepts that need to be taught prior to the park visit. Use of the post-visit activities is also critical to the learning process because they guide the students in making scientific deductions and in developing their environmental stewardship ethics.

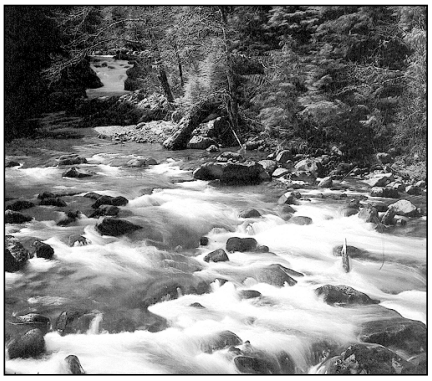
Following this preface, you will find background information on the National Park Service and an overview of Point Reyes National Seashore. To provide your students with a better understanding of the place that they will be visiting, we recommend that you share this information with your students. For an in-depth overview of the National Park Service, visit our website at ***www.nps.gov***.

Point Reyes National Seashore provides outstanding opportunities for learning about natural and cultural resources. There are also exceptional educational opportunities provided by Park partners such as the Point Reyes Bird Observatory, Audubon Canyon Ranch, and Point Reyes National Seashore Association. To learn more about the Park and our partners, visit our website at ***www.nps.gov/pore***.

The National Park Service

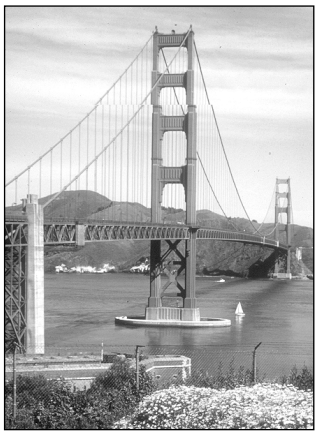
The National Park Service cares for special places saved by the American people so that all may experience our heritage.

Experience Your America

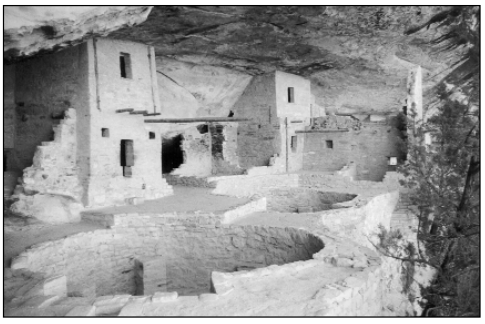

Olympic National Park

On August 25, 1916, President Woodrow Wilson signed the act creating the National Park Service, a new federal bureau in the Department of the Interior responsible for protecting the 40 national parks and monuments then in existence and those yet to be established.

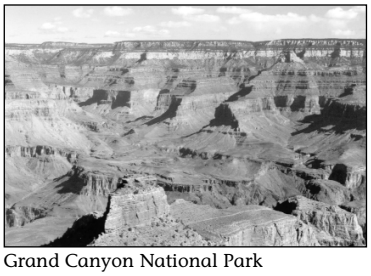
This "Organic Act" of 1916 states that "the Service thus established shall promote and regulate the use of Federal areas known as national parks, monuments and reservations . . . by such means and measures as conform to the fundamental purpose of the said parks, monuments and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."


Golden Gate National Recreation Area

The National Park Service still strives to meet these original goals, while filling many other roles as well: guardian of our diverse cultural and recreational resources; environmental advocate; world leader in the parks and preservation community; and pioneer in the drive to protect America's open space.


Mesa Verde National Park

The National Park System of the United States comprises over 379 areas covering more than 83 million acres in 49 states, the District of Columbia, American Samoa, Guam, Puerto Rico, Saipan, and the Virgin Islands. Although not all parks are as well known as the Grand Canyon and Yellowstone, all are areas of such national significance that they have been included in the National Park Service—ancient ruins, battlefields, birthplaces, memorials, recreation areas, and countless other wonders. Point Reyes National Seashore is one of ten national seashores.

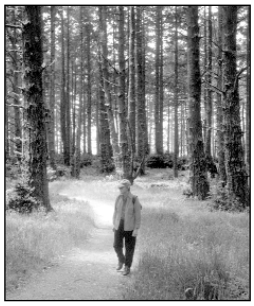

Grand Canyon National Park

The future of the National Park System lies in understanding and protecting its meanings, values, and resources. Each part of the system represents the United States and a part of our heritage. Preservation of individual sites and the entire system will ensure the essence of quality remains in our lives and the lives of all future generations.

Point Reyes National Seashore


Bruce Farnsworth

Point Reyes National Seashore was established to preserve and protect the natural and cultural features and natural ecosystems along the diminishing undeveloped coastline of the western United States. Located just an hour's drive from a densely populated metropolitan area, the Seashore is a sanctuary for countless plant and animal species. With half of Point Reyes National Seashore designated as wilderness, it provides a sanctuary for the human spirit—for discovery, inspiration, solitude, and recreation—and a reminder of the human connection to the land.

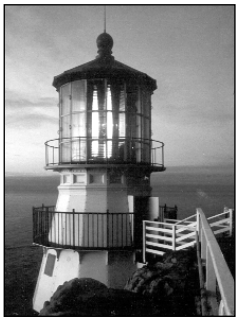

Sue Van Der Wahl

Point Reyes National Seashore comprises over 71,000 acres, including 32,000 acres of wilderness area. Estuaries, windswept beaches, coastal scrub, coastal grasslands, salt marshes, and coniferous forests create a haven of 80 miles of unspoiled and undeveloped coastline located just an hour's drive from an urban area populated by seven million people. Abundant recreational opportunities include 140 miles of hiking trails, backcountry campgrounds, and numerous beaches.

The San Andreas Fault separates the Point Reyes Peninsula from the rest of the North American continent. Granite bedrock found here and not found again until the Sierra Nevada range suggests the peninsula is geologically dynamic. According to geologists, the land that is now called Point Reyes has moved some 300 miles northwest over a period of 100 million years and is still moving.


Rich Stallcup

As wildland habitat is developed elsewhere in California, the relevance of Point Reyes as a protected area with a notably rich biological diversity increases. Over 45% of North American avian species and nearly 18% of California's plant species are found here. Point Reyes also contains some examples of the world's major ecosystem types. For this reason and because Point Reyes is dedicated to the conservation of nature and scientific research, it was recognized in 1988 by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) Man and the Biosphere program and named as part of the Central California Coast Biosphere Reserve.


Bruce Farnsworth

The cultural history of Point Reyes spans many lives and ways of living with the land. The Coast Miwok people are the first known residents of this peninsula. Archeologists have identified over 100 village sites in the Seashore and cultural traditions are still celebrated in the Park annually. Overlapping the Coast Miwok were Mexican land grantees, lighthouse keepers, and lifesaving station crews. To this day, agricultural operations that were built near the turn of the twentieth century continue within the Seashore's pastoral zone.


NPS Collection

Educational Opportunities at

Point Reyes National Seashore

Point Reyes National Seashore provides an outdoor classroom and learning laboratory for the study of geological and ecological processes and changing land-use values in which a greater understanding of and caring for public lands can be fostered.

Ranger-led Curriculum-based Education Programs

Reservations for ranger-led programs are requested in writing and assigned on a first-come first-serve basis. Visit ***www.nps.gov/pore*** for the reservation form and calendar.


NPS Collection

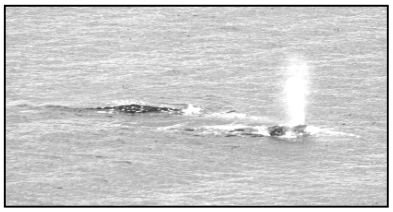
K-2 Students explore the natural resources of the seashore with Park Rangers in the Bear Valley area or in their classroom.

3-4 Students immerse themselves in the Coast Miwok culture by completing a comprehensive curriculum and visiting the Coast Miwok cultural exhibit, Kule Loklo.


NPS Collection


NPS Collection

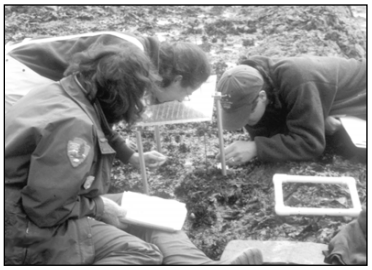
4 Students revisit the days of early lighthouse keepers while operating the original Point Reyes Lighthouse clockwork with Park Rangers.


NPS Collection

5 Students study the oceanic influences on the Point Reyes Peninsula by completing a classroom curriculum and viewing gray whales and elephant seals with Park Rangers.

6-8 Students participate in Ranger-led stewardship activities such as habitat restoration, water quality monitoring and beach cleanups.

Ranger-led Training Programs


NPS Collection

9-12 Students become DOCENTS to assist middle school teachers with classroom teaching and use of scientific research tools on seashore field trips (service learning credits earned).

Students become RESEARCH ASSISTANTS at the Pacific Coast Learning Center by participating in the inventorying and monitoring of seashore resources.


NPS Collection

Teachers Teacher workshops are offered throughout the year for existing park curricula and for field trip planning. Visit the Seashore's website at ***www.nps.gov/pore*** for a calendar of workshops.

Classroom and Field Trip Curriculum

Based on the National and State Science and Social Science Standards

3-4 

Teacher packets are available for field trips to the recreated Coast Miwok village, Kule Loklo, located near the Bear Valley Visitor Center.

The "Creating Coastal Stewardship through Science" middle school curricula are available to teachers who attend a one-day workshop at Point Reyes or a teacher in-service training.

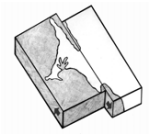
6-8 

Completion of the ***Identifying Resident Birds*** Curriculum, as a companion to a birdwatching field trip, will enable students to observe and identify different bird species, their habitats and their behaviors. A visit to Point Reyes Bird Observatory will also enable students to observe bird banding and netting and to understand the most common threats to bird survival.

Completion of the ***Monitoring Creek Health*** Curriculum, as a companion to a Ranger-led creek program, will enable students to observe and understand the complexity and sensitivity of creek habitats and their role in protecting them.

Completion of the ***Discovering Northern Elephant Seals*** Curriculum, as a companion to an elephant seal viewing field trip, will enable students to observe and understand the amazing adaptations and behaviors of Northern elephant seals.

Completion of the ***Defining Habitats*** Curriculum, as a companion to a Park field trip, will enable students to observe and understand the complex land and ocean habitats of the Point Reyes Peninsula and their roles in habitat protection.



Completion of the ***Uncovering the San Andreas Fault*** Curriculum, as a companion to a geology field trip, will enable students to observe and understand the existence of the San Andreas Fault and the implications that it has for area residents.

Completion of the ***Investigating Tule Elk*** Curriculum, as a companion to an elk viewing field trip, will enable students to observe and understand their behaviors and the issues that surround their management.

Completion of the ***Observing Pacific Gray Whales*** Curriculum, as a companion to a whale watching field trip, will enable students to observe and understand gray whale adaptions and behaviors, and the factors that influence their survival.

Educational Facilities

The **Historic Lifeboat Station** is available to educational groups for overnight use. Nightly fees are charged. Group size must be under 25 (including chaperones). Reservations are made on a first-come first-serve basis by completing the boathouse form on our website at ***www.nps.gov/pore.***

The **Clem Miller Environmental Education Center** is an overnight facility available by lottery to school groups visiting for multiple-night stays September through May. The facility is used for summer camps during the summer months. Fees are charged. For more information, contact Point Reyes National Seashore Association at (415) 663-1200.

The **Pacific Coast Learning Center** is a day-use facility located on Highway 1. This facility is used by researchers and students to study the natural and cultural resources of the Seashore.

The **Bear Valley Visitor Center** is a day-use facility that is open to school groups Monday through Friday 9 A.M. to 5 P.M. Exhibits on natural and cultural resources are found here. Books, brochures and other educational materials are available.

The **Ken Patrick Visitor Center** is located on Drakes Beach, approximately 30 minutes from the Bear Valley Visitor Center. This facility is open year-round on weekends and holidays from 10 A.M. until 5 P.M. Ranger-led elephant seal programs meet at this Visitor Center. Exhibits and a 150-gallon saltwater tank are located here. Books, brochures and other educational materials are available.

The **Lighthouse Visitor Center** is located on the outermost tip of the Peninsula, approximately 45 minutes from the Bear Valley Visitor Center. This facility is open Thursday through Monday 10 A.M. until 4:30 P.M. (closed Tuesdays and Wednesdays). Ranger-led whale programs and lighthouse tours meet at this Visitor Center. Exhibits on maritime history and whale biology are located here. Books, brochures and other educational materials are available.

The **Lighthouse** is located below the Lighthouse Visitor Center at the bottom of a 308-step staircase. The lens room is usually open from 2:30 P.M. until 4 P.M. Thursday through Monday or as weather and staffing permit. High winds always close the lens room. Space in the lens room is limited so reservations are required for groups. Call (415) 663-1534 to confirm existing weather conditions.

Group Camping/Overnight Opportunities

* This listing is provided for your convenience and does not constitute a recommendation or endorsement of any of these facilities.

All overnight camping in **Point Reyes National Seashore** requires a permit and advance reservations. Group sites are very limited and in high demand. Sky, Coast, and Wildcat Camps are all backcountry campgrounds that require hiking to access them. A fee is charged. For more information, visit the Seashore's website at ***www.nps.gov/pore.***

The **Point Reyes Hostel** offers a domitory-style group cabin with a fully equipped kitchen and showers. For additional information and reservations, call (415) 663-8811 during office hours. Office hours: 4:30 P.M. – 9:30 P.M. and 7:30 A.M. – 9:30 A.M.

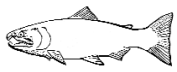
Samuel P. Taylor State Park, located 6 miles east of the Seashore on Sir Francis Drake Boulevard offers campsites for groups. A fee is charged. Reservations are highly recommended. For more information, visit their reservations website at ***www.reserveamerica.com.***

Olema Ranch Campground is located half a mile from Seashore headquarters on Highway 1. It is privately owned. Several large group sites are available. Fees are charged. For more information, call (415) 663-8001.

The **Marconi Center** is located 8 miles north of Seashore headquarters on Highway 1. This facility is operated by California State Parks. Lodging, conference rooms and catered meals are provided for a fee. For more information, call 1-800-970-6644 or visit their website at ***www.marconiconfctr.org.***

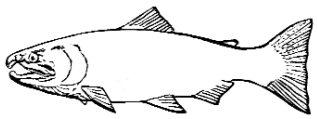
Creating
Coastal Stewardship
through Science

National Park Foundation



Monitoring Creek Health

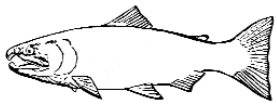
Creating
Coastal Stewardship
through Science



Monitoring Creek Health

Teacher Preparation

Monitoring Creek Health



Point Reyes National Seashore protects a portion of the watershed necessary to ensure safe migration and spawning of coho salmon and steelhead trout. This protection is necessary as both species have been directly impacted by human activities and development. Healthy creeks are one step toward increasing and maintaining their population numbers. Their true hope for survival lies in changing human attitudes, behaviors, and priorities.

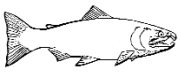
Completion of this unit, as a companion to your Park field trip, will enable your students to observe and understand creek habitats. Most importantly, your students will be prepared to take action in protecting their watersheds through a self-designed stewardship project.

Considerations

When: Year-round, but several days after a winter storm is the best time to make your visit.

Where: The best creek to visit in the Bear Valley Area is located near the Earthquake Trail. If you are staying at the Education Center, discuss the best location with the Clem Miller Director. Salmon viewing occurs at a seperate location from monitoring.

How: This unit may be used independently of all other units. If you want to use an additional unit during your visit, we suggest the Defining Habitats unit. This will give students a more complete understanding of other resources at Point Reyes National Seashore and their relationship to creek ecology.



Weather: The chart below lists average climate expectations based on previous years data. The weather is subject to change quickly and can vary dramatically from different locations within the Seashore on the same day.

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Temperature (Fahrenheit)												
Normal Daily Maximum	53	55	55	57	60	62	64	64	65	62	58	54
Normal Daily Minimum	41	42	42	43	47	50	51	52	51	48	45	42
Extreme High	78	85	80	92	94	99	96	96	103	96	81	79
Extreme Low	21	26	29	32	32	39	39	42	39	32	29	18
Precipitation (inches)												
Normal	12.0	9.0	8.0	4.0	3.0	1.0	0.3	0.8	2.0	4.0	9.0	12.0
Maximum	20.0	16.0	15.0	11.5	8.0	4.0	2.5	6.0	7.0	13.0	18.0	19.0

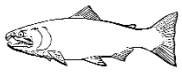
Seasonal Events: Consult the chart below to assess which months may be best for a class visit to Point Reyes National Seashore.

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Gray Whale Migration	✔		✔	✔								
Elephant Seal Breeding	✔	✔	✔									
Bird Migration			✔	✔	✔				✔	✔	✔	✔
Coho Spawning	✔											✔
Steelhead Trout Spawning		✔										✔
Tule Elk Rut Season							✔	✔	✔			
Peak Flower Blooms			✔	✔	✔							
Tidepooling	✔	✔	✔									
Geology	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Ocean and Land Habitats	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Resident Birds	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔

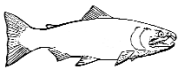
Chaperone Preparedness and Assistance

The success of your field trip will depend on your ability to actively prepare and involve your parent chaperones in the field trip activities. Without adult guidance, many of the students will not complete their field journals. It is essential that your field trip have as much structure as your classroom lessons. To accomplish this, we recommend that you assign each of your parents to a small group of students. Inform parents that they are responsible for assisting their students with the field observations and with the journal questions. Provide chaperones with their own copies of the student journals and encourage them to complete their journals with the students. Rangers will be utilizing chaperones to assist with creek assessment equipment.

Suggested Lesson Plan



PRE-VISIT		Time needed: 7 hours
Activity #1	How Can We Learn More about Coho Salmon and Steelhead Trout? *Students use a newspaper and vocabulary list to complete questions and activities about both species of fish.*	1 hour
Activity #2	What Can We Learn about Water? *Students practice water testing in class.*	2 hours
Activity #3	Who Is in the Aquatic Food Pyramid and What Is Their Relationship to the Health of an Ecosystem? *Students research common aquatic insects and build food pyramids for the coho salmon and steelhead trout.*	2 hours
Activity #4	What Can We Expect on Our Field Trip to the Creeks of Point Reyes National Seashore? *Students prepare for field trip by reviewing expectations and creating field journals.*	1 hour
Activity #5	Safety and Stewardship Challenge *Proper behaviors around National Park resources are examined in a game format.*	1 hour
ON-SITE		Time needed: 2 hours
Field journal	How Healthy Is This Creek? *Students complete their field journals by performing various water quality tests and general observations.*	2 hours
POST-VISIT		Time needed: 3+ hours
Activity #1	What Can We Learn from Our Field Journals? *Students compile data from their field journals to draw conclusions between what they previously learned in class and what they experienced in the field.*	2 hours
Activity #2	How Can We Compare and Share Our Creek Monitoring Results? *Students add their creek data to the North Bay Riparian Station's website. Using results from other classes, students compare their creek data with other groups monitoring in the area.*	Time varies
Activity #3	What Is Your Role in Preserving Our Watershed? *Students investigate various professions and actions that promote a healthy watershed. This information is shared with the community.*	Time varies
Activity #4	How Can We Choose and Complete the Best Stewardship Project? *Students complete a project that will benefit salmon, trout and the environment.*	Time varies



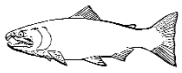
Field Trip Logistics

Students need:	*Teachers need:*	*Chaperones need:*
❒ rain gear	❒ rain gear	❒ rain gear
❒ warm, layered clothes	❒ warm, layered clothes	❒ warm, layered clothes
❒ gloves and hat	❒ gloves and hat	❒ gloves and hat
❒ sunscreen and sunglasses	❒ sunscreen and sunglasses	❒ sunscreen and sunglasses
❒ bag lunch with drink	❒ bag lunch with drink	❒ bag lunch with drink
❒ water	❒ water	❒ water
❒ waterproof boots or tennis shoes	❒ waterproof boots or tennis shoes	❒ waterproof boots or tennis shoes
❒ clipboard with field journal and pencil	❒ map with directions	❒ map with directions
❒ permission slip	❒ pencil sharpeners and extra pencils	
	❒ teacher backpack and field trip kits from Bear Valley Visitor Center	
	❒ first aid kit	
Optional:		
❒ small backpack	❒ small backpack	❒ small backpack
❒ binoculars	❒ binoculars	❒ binoculars
	❒ camcorder/camera	❒ camcorder/camera

Other Things to Remember:

- Some water quality tests require students to enter the creek. Rubber boots or shoes that can get wet are best. Closed-toe shoes are recommended.
- Bathrooms, drinking water, and the creek kits are available at the Bear Valley Visitor Center. This should be your first stop when visiting Point Reyes National Seashore.
- Have students bring bag lunches since you will be visiting during lunch time.
- If you have a student with accessibility concerns, please call the Park for suggestions.

Evaluation Process



We need your help! Since this guide was designed for your use, only your feedback will make it better. Following the unit overview is a preaddressed evaluation form. Please complete, fold in thirds, affix postage, and drop in the mailbox. In addition to the evaluation forms, we encourage other types of feedback. Please send any of the following items from your students:

1. Videotape or photos of Park field trip
2. Completed student journals
3. Any completed stewardship activities, including posters or newsletters
4. A class portfolio illustrating lesson activities
5. Any completed classroom projects or photographs of projects
6. Other items illustrating student feedback

Please indicate if these items need to be returned. We will use them to create a project library, highlight classroom efforts on our website and in Park publications, and complete evaluations of student outcomes.

Send to: National Park Service
Point Reyes National Seashore
Division of Interpretation
attn: Education Specialist
Point Reyes, CA 94956

Reservations

You must have a confirmed reservation for this field trip so a Park Ranger can assist your group. Please use the reservation form provided in this unit.

Creek Kit Contents

A Park Ranger will reserve creek kits for your confirmed class trip. The contents of each kit are listed below:

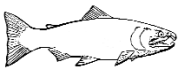
pH test:
1 box of pH indicator strips
2 water sample containers
1 stopwatch (for all tests)
7 enlarged pH charts

Dissolved Oxygen Test:
1 wastewater bottle
dissolved oxygen tablets
7 glass test-tubes with black caps
7 Dissolved Oxygen instruction cards
1 test-tube drying rack

First Aid Kit:
topical antihistamine/analgesic
basic supplies

Temperature/velocity Test:
2 thermometers
dry sticks (to float in creek)
1 rope (12 feet)

Aquatic Insect Station:
1 ruler, aquatic insect collection pan
ice-cube tray for insect sorting
4 paint brushes
7 plastic spoons
7 aquarium nets
2 basters
2 two-way magnifying viewers
1 water ecology book
7 laminated insect keys
various ID guides (tracks, plants, birds)



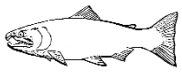
California Science Standard Links

Teacher Preparation

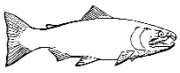
	"Monitoring Creek Health" Unit									
	Pre-Visit					On-Site	Post-Visit			
	#1	#2	#3	#4	#5	Field Journal	#1	#2	#3	#4
Sixth Grade										
1										
2								a,b		
3										
4										
5	c,e		a,b, e			e		b		
6										
7	d	b		b,h		b,d,e,h	b,c, d,e		b,d	
Seventh Grade										
1										
2										
3										
4										
5	d									
6										
7	d,e	a	b	a,c		a,c,e	a,c	e	a,b, c,e	
Eighth Grade										
1						b	b			
2										
3										
4										
5		e								
6										
7										
8										
9				b			b		b	

Correlations to "A Child's Place in the Environment"

California's State Approved Environmental Education Curriculum



	"Monitoring Creek Health" Unit									
	PRE-VISIT					ON-SITE	POST-VISIT			
	#1	#2	#3	#4	#5	Field Journal	#1	#2	#3	#4
A Child's Place in the Environment: Grade 6 Lessons										
What Are Some Components of an Ecosystem?			✔							
What Role Does Diversity Play in an Ecosystem?			✔			✔			✔	✔
How Does the Sun's Energy Flow through an Ecosystem?			✔				✔			
What Interrelationships and Niches Can Be Identified in an Ecosystem?			✔							
What Cycles Exist in an Ecosystem and How Do They Sustain an Ecosystem?						✔				
What Examples of Ecological Principles Can Be Observed in an Ecosystem?						✔			✔	
What Are the Components and Relationships of Human Communities and How Do They Compare to Ecosystems?						✔			✔	✔
What Are Some Limiting Factors in Human Communities and in Ecosystems?		✔								✔
How Do Energy Sources Used in Human Communities Compare to Those Used in Ecosystems?										
How Can Organic Solid Waste in Human Communities Be Composted?								✔		
How is Land Used by Our Community and How Are Land-Use Decisions Made?										
How Can the Disposal of Solid Waste Affect the Quality of the Environment?								✔	✔	
How Does the Motor Vehicle Transportation System Affect the Environment?										
How Do Human Beings Affect Watersheds?	✔				✔	✔		✔		✔
What Human Actions Enhance, Protect, and Sustain the Quality of the Environment?					✔	✔		✔	✔	✔
What Have Communities Done to Become More Sustainable?										✔
What Projects Can Students Implement to Make Their Classroom and School or Community More Sustainable?	✔							✔	✔	✔



Acknowledgments

This unit was written by area teachers, Park Rangers, scientists, and area naturalists. Special thanks to the following people:

Point Reyes National Seashore: Coho Project/ Hydrology

Ronald W. Smith, Fisheries Biologist
Brannon Ketcham, Hydrologist
David Press, Fisheries Biologist
Greg Brown, Fisheries Biologist

Workshop Participants

Tricia Corsetti, Teacher, Tomales Elementary School, Tomales
Ted Stoeckley, Teacher, Hall Middle School, Larkspur
Sandy Dierks, Teacher, Bolinas School, Bolinas
Craig Conte, Teacher, La Tercera School, Petaluma
Trudie Behr-Scott, Teacher, Hill Middle School, Novato
Libby Schaaf, Education Specialist, Muir Woods National Momument
Chris Choo, Bay Institute

Point Reyes National Seashore: Division of Interpretation

Melinda Repko
Daisy Martin
Lynda Doucette
Lynne Dominy
Christie Denzel Anastasia

Unit Evaluation

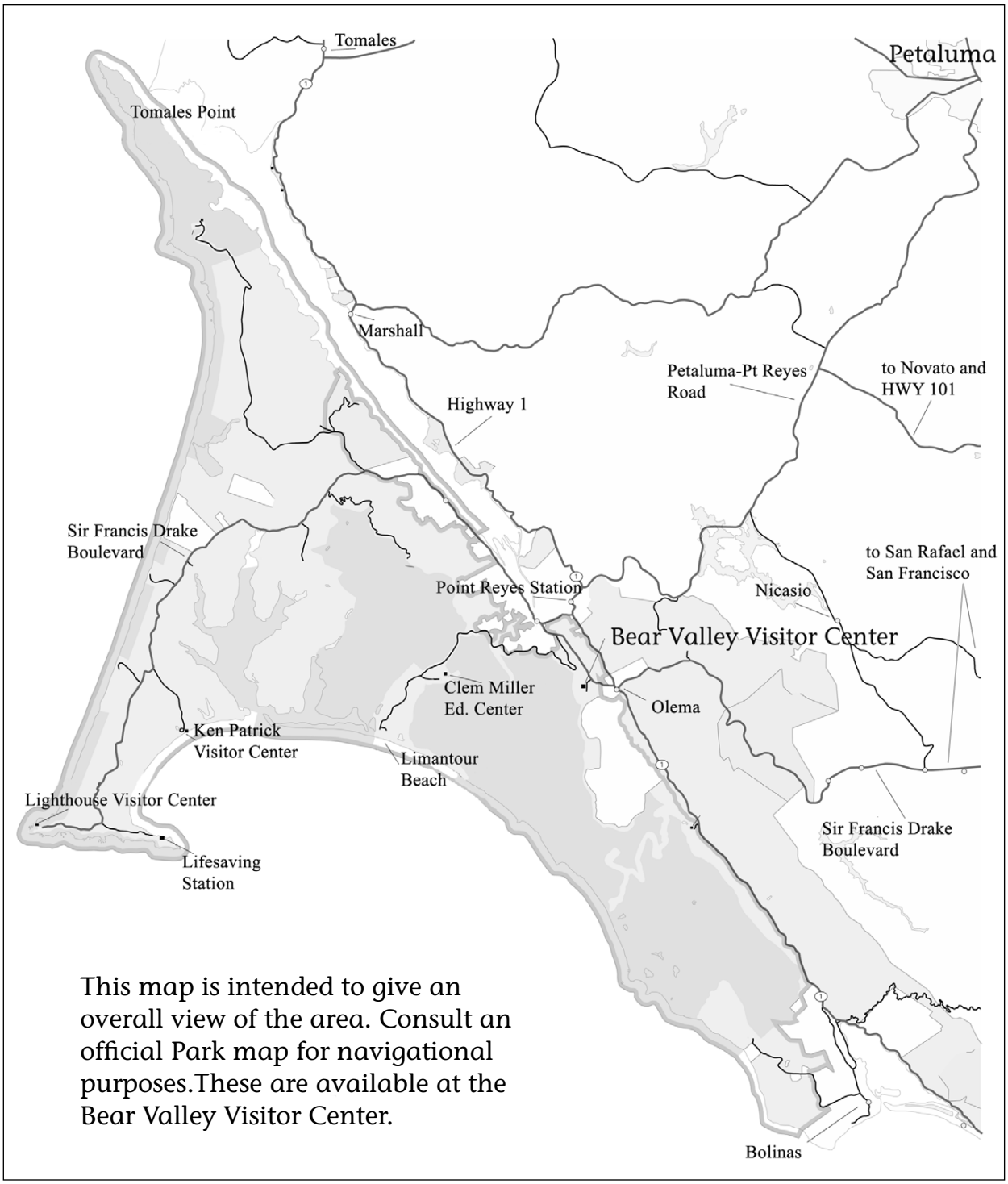
Amy Marweg, West Marin School, Point Reyes Station
Tricia Corsetti, Tomales Elementary School, Tomales
Sylvia Terry, PineCrest School, Sonora
Trudie Behr-Scott, Hill Middle School, Novato
Josh Risley, Tomales School, Tomales
Sandy Dierks, Bolinas School, Bolinas
Division of Interpretation

Unit Design

Myrna Vladic, Bad Dog Graphics, San Anselmo
Curtis Doucette, Point Reyes National Seashore Association
Lynne Dominy
Christie Denzel Anastasia

Point Reyes National Seashore

Attachment

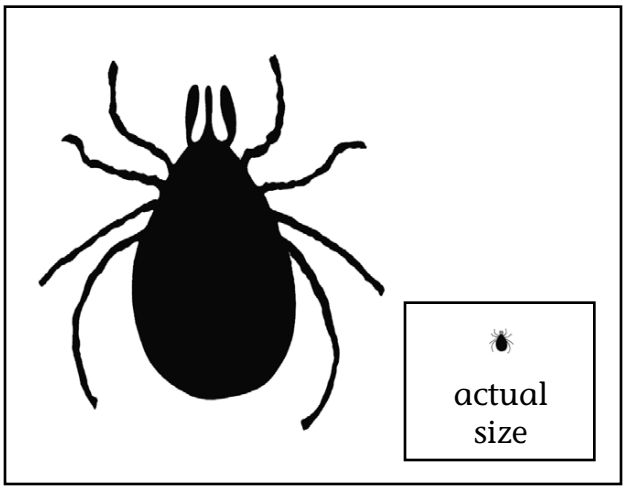


Approximate Driving Times/Distances

Petaluma to Bear Valley VC	40 min./19 miles
Novato to Bear Valley VC	40 min./19 miles
San Anselmo to Bear Valley VC	30 min./20 miles
Bear Valley VC to Limantour Beach	20 min./9 miles
Bear Valley VC to Tomales Point	30 min./19 miles
Bear Valley VC to Ken Patrick VC	30 min./15 miles
Bear Valley VC to Ligthouse VC	45 min./22 miles

Lyme Disease, Stinging Nettle, and Poison Oak

Lyme disease is an illness caused by bacteria transmitted to people by tick bites. Not all ticks carry the disease. Field studies in Marin County show that 1–2% of the western black-legged ticks carry Lyme disease. Since there are several other species of ticks in Marin, the odds of a tick bite producing Lyme disease is less than 1 in 100. Even so, Lyme disease can be severe; it is important to understand the prevention and symptoms.



Symptoms:

arthritis and joint pain
lethargy
heart problems
pain/limping
fever
kidney problems
depression
bulls-eye rash (50% of victims)

Tick species in California include:

Western black-legged tick and Pacific coast tick (West Coast)
Lone star tick and American dog tick (throughout U.S.)

How to avoid tick bites:

- Wear light-colored, long-sleeved clothes so you can more easily see the ticks.
- Tuck shirt into pants and pants into socks to keep ticks away from your skin.
- Stay on trails.
- Apply an insect repellent, labeled for ticks, to shoes, socks, and pants.
- Check yourself completely after a hike. Closely check any skin irritation. Ticks anesthetize the skin before biting so you'll seldom feel the original bite.

What to do if bitten:

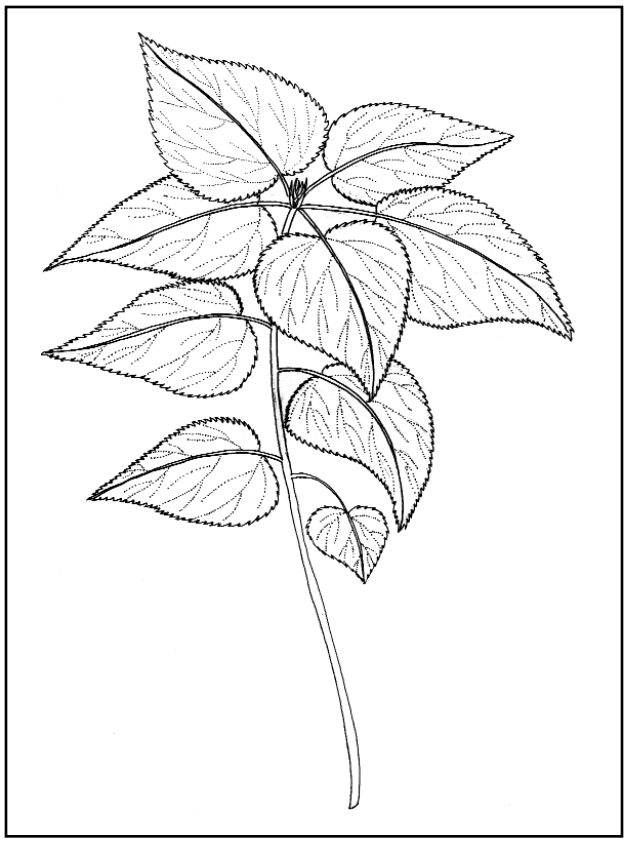
- Use tweezers to grasp tick at point of attachment, as close to skin as possible. Gently pull tick straight out.
- Save tick, notify your doctor.
- Don't panic—ticks need to be embedded for 24–48 hours to transmit bacteria. The ticks that transmit Lyme disease are usually in a developmental phase in which they are smaller than the head of a pin.

References:

Ticks and Lyme Disease in the National Parks
Lyme Disease Foundation/***www.lyme.org***

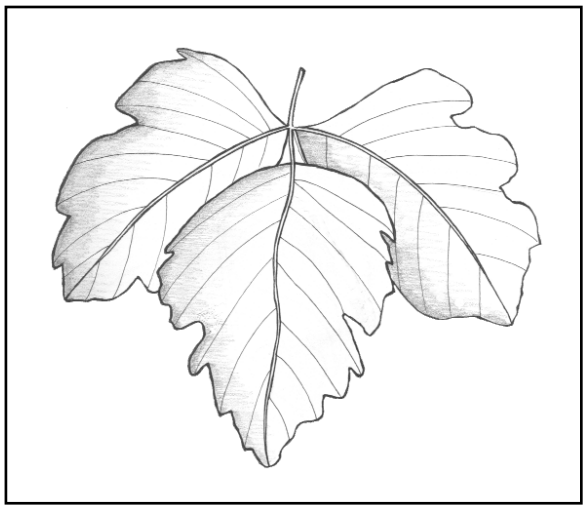
Lyme Disease, Stinging Nettle, and Poison Oak

(continued)

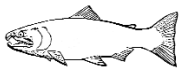


Stinging nettle is native to Europe, but grows at Point Reyes National Seashore. It can cause a painful rash that stings for up to twelve hours after brushing up against the plant. A topical analgesic (used to treat poison ivy or bug bites) can be applied to help alleviate the sting. Study the picture and have someone point out the plant in the Seashore to aid in its identification.

Poison oak usually causes an itchy rash if you are sensitive to it. You can get a rash by touching the plant, its leaves or roots. You can also contract poison oak by petting your dog (if the oils are on its coat) or by touching clothing that has touched poison oak. Rashes may occur several days after the initial contact with the plant. Severe rashes may affect the lungs. If you have difficulty breathing, call 9-1-1 or go to the nearest emergency room immediately. Preventive topical ointments are available to help avoid reactions to poison oak. Learn to recognize the compound leaves with a shiny appearance.



Creating Coastal Stewardship through Science



Reservation Form

If you are planning a trip to Point Reyes National Seashore to use this curriculum, please notify the Park to avoid conflicts with other groups and to be notified about any unusual closures. Mail this form at least two weeks in advance (fold in thirds and affix postage) or call (415) 663-8522 Extension 259 to leave a message.

Teacher Name: _____

School Name: _____

School Address: _____

City/State: _____ Zip Code: _____

School Phone: _____ School Fax: _____

Email Address: _____

Grade: _____ Class Size: _____

Home Phone: _____

Field Trip Options

Monitoring Creek Health
Observing Pacific Gray Whales
Discovering Northern Elephant Seals
Investigating Tule Elk
Uncovering the San Andreas Fault
Identifying Resident Birds
Defining Habitats

Field Trip Preferences

Field Trip Topic	Dates (list three in order of preference)	Time
1. _____	_____	_____
	_____	_____
	_____	_____
2. _____	_____	_____
	_____	_____
	_____	_____

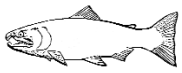
Comments

_____ Confirmation Letter
_____ Materials Sent

National Park Service
Point Reyes National Seashore
Division of Interpretation
attn: Education Program Coordinator
Point Reyes Station, California 94956

Creating
COASTAL
STEWARDSHIP
through Science

Creating Coastal Stewardship through Science



Evaluation Form

Please help us develop and improve our programs by taking a few minutes to complete this form. This evaluation form is preaddressed, but needs to be folded in thirds and provided with postage. If you prefer, email comments to: ***PORE_Education@nps.gov***

Name: _____ School Name: _____

School Address: _____

City/State/Zip Code: _____

School Phone: _____ School Fax: _____

Email Address: _____

Class Size/Grade: _____

Date of Visit: _____ Program/Location: _____

Getting Your Visit Set Up

Do you have any suggestions to make logistics easier? (maps, directions, reserving programs)

Curriculum Materials

Which lessons were the most effective?

Relevance of content to my students and curriculum:

Grade appropriateness?

Program Assessment

How does this program fit into California/National Standards and your personal education program?

Strengths/weaknesses of program?

Best part of experience?

What is the level of support at your school for this program?

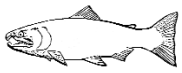
What could the National Park Service do to improve your education program?

Overall, how would you respond if a colleague asked about this program?

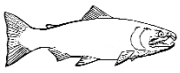
Highly recommended Recommended Recommended with some qualifications
Not recommended

National Park Service
Point Reyes National Seashore
Division of Interpretation
attn: Education Specialist
Point Reyes Station, California 94956

Creating
COASTAL
STEWARDSHIP
through Science

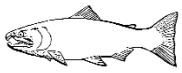


Acid	capable of reacting with and dissolving certain metals to form salts; having a sour taste; a substance capable of giving up a proton
Adaptation	adjustment or change in an organism to become suitable to a new situation
Alevin	the yolk-sac stage of salmonids
Alkaline	having a pH greater than seven
Anadromous	describes fishes that begin life in fresh water, then go to the ocean to live, and finally return to fresh water to spawn (derived from Greek = "running upward")
Anoxic	absence of oxygen
Base	ability to react with acids to form salts; having a bitter taste; a slippery solution; capable of providing electrons
Benthic	bottom dwelling organisms found on stones, in mud, or vegetation
Carnivore	flesh eating mammals
Class	taxonomic category of plants and animals ranking above an order and below a phylum
Consumer	organism that eats other mammals
Creek ecology	relationship between organisms depending on or living around a creek
Dissolved oxygen	gaseous oxygen that is dissolved in water
Ecosystem	a community of interrelated life forms and non-living physical parts
Erosion	the wearing away of land by wind or water
Estuary	the mouth of a river where fresh and salt water mix
Family	taxonomic category below an order, above a genus (Kingdom/ Phylum/ Class/ Order/ Family/ Genus/ Species)
Food chain	an arrangement of the organisms of an ecological community according to the order of predation in which each member uses the next lower member as a food source



Vocabulary

Food web	the totality of interacting food chains in an ecological community where food energy passes among organisms as each consumes and is preyed on by others
Fry	a young, immature salmon or steelhead that has not smolted yet
Genus	taxonomic category ranking below a family and above a species
Habitat	the native environment of a plant or animal. The kind of place that is natural for the life and growth of a plant or animal
Herbivore	feeding on plants, plant-eating
Kingdom	broadest, most inclusive taxonomic category of organisms having certain basic characteristics (There are five kingdoms: Plantae, Animalia, Fungi, Monera, Protista)
Migrate	to physically move from one region to another depending on seasons; salmon hatch in fresh water, migrate to sea, and spawners migrate back again to fresh water
Omnivore	eating both animal and plant substances
Oncorhynchus	the genus name for the Pacific salmon (derived from Greek Oncho = hook, rhynchus = beak or snout)
Order	taxonomic category of plants and animals ranking above the family and below the class
Parr	a young salmon during the first one to two years of its life when it lives in fresh water
Parr Marks	dark round, or oval markings on the bodies of salmonid fry
pH	a measure of the "potential of hydrogen" of a solution based on a scale of 1–14 where pH 1 is the most acidic, pH 7 is neutral and pH 14 the most basic
Phylum	taxonomic category of plants and animals ranking above the class and below the kingdom
Producers	organism that contains chlorophyll to make food by photosynthesis



Vocabulary

Redd	a nest that a female salmon or steelhead digs with her tail in the gravel, and a place where her eggs are deposited
Resource manager	person who controls or directs research, monitoring, or actions toward natural or cultural resources
Riparian	a zone that links terrestrial and aquatic systems
Salmonid	of or belonging to the family Salmonidae, which includes salmon, trout, and whitefish
Scavenger	an animal that feeds on dead animal's flesh or other decaying organic matter
Smolt	a young salmonid adapting to life in the ocean environment
Spawn	to produce young or eggs, especially in large numbers
Species	taxonomic category ranking below a genus, consisting of organisms capable of interbreeding
Stewardship	choices and actions to protect our environment
Terrestrial	living or growing on land, not aquatic
Tributary	a smaller stream or river that flows into another larger stream or river
Watershed	the land that serves as a drainage for specific streams or rivers